PLANT ITEM MATERIAL SELECTION DATA SHEET

HOP-SCO-00001 & HOP-SCO-00004 (HLW)
Thermal Catalytic Oxidizer

ISSUED BY
RPP-WTP PDC

- Inlet Temperature (°F) (nom/max): 330/330
- Operating Pressure (in-WG) (max/min): 80/-80
- Location: outcell

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 4 and 5

Operating Modes Considered:

- Assume off-normal conditions same as normal operations.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.00 inch (includes 0.00 inch erosion allowance)

Process & Operations Limitations:

- None

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EXPIRES 12/10/04

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This bound document contains a total of 5 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	9/15/04	Issued for Permitting Use			
0	9/24/02	Issued For Permitting Use	DLA	JRD	MHoffmann

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Corrosion Considerations:

The thermal catalytic oxidizers oxidize organics to carbon dioxide, water, and possibly acid gases. The equipment operates at low relative humidity.

a General Corrosion
None anticipated.

Conclusion
304L is satisfactory.

b Pitting Corrosion
Pitting corrosion will only be a concern if column is allowed to cool with the formation of moisture.

Conclusion
At the stated operating conditions, pitting corrosion is not a significant concern, but 316L is recommended for its greater resistance to pitting.

c End Grain Corrosion
None anticipated.

d Stress Corrosion Cracking
Stress corrosion cracking will only be a concern if column is allowed to have multiple cooling cycles with the formation of liquid.

Conclusion
At the stated operating conditions, pitting corrosion is not a significant concern.

e Crevice Corrosion
Crevice corrosion will only be a concern if column is allowed to have multiple cooling cycles with the formation of liquid.

Conclusion
At the stated operating conditions, crevice corrosion is not a significant concern.

f Corrosion at Welds
None anticipated.

Conclusion
Not a concern.

g Microbiologically Induced Corrosion (MIC)
Conditions in this equipment are not conducive to MIC

Conclusion
Not a concern.

h Fatigue/Corrosion Fatigue
Equipment shall be designed to accommodate the expected fatigue cycles over the 40 year design life.

Conclusion
Not a concern.

i Vapor Phase Corrosion
Offgas equipment is essentially entirely vapor space. Comments under General Corrosion apply.

Conclusion
Not a concern.

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j Erosion
Velocities are not expected to be sufficient to cause concern.

Conclusion
Not a concern

k Galling of Moving Surfaces
None expected.

Conclusion
Not a concern.

l Fretting/Wear
None anticipated

Conclusion
Not a concern.

m Galvanic Corrosion
None anticipated.

Conclusion
Not a concern.

n Cavitation
None anticipated.

Conclusion
Not a concern.

o Creep
Creep is not a concern at these temperatures.

Conclusion
At the stated operating conditions, creep is not a concern.

p Inadvertent Addition of Nitric Acid
Introduction of nitric acid into the offgas stream is not a likely scenario.

Conclusion
Not applicable.

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OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Thermal catalytic oxidizer (HOP-SCO-00001, HOP-SCO-00004)

Facility HLW

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/m^3					
HCl	g/m^3					
HF	g/m^3					
Iron	g/m^3					
NO	g/m^3	2.92E-01	3.02E-01			
NO2	g/m^3	1.07E-01	1.16E-01			
Phosphate	g/m^3					
SO2	g/m^3					
Mercury	g/m^3					
Carbonate	g/m^3					
Undissolved solids	wt %					
Other (NaMnO4, Pb,...)	g/m^3					
Other	g/m^3					
Humidity	%	0.064%	0.061%			
Temperature	°F					Note 2

List of Organic Species:

Notes:

1 Concentrations less than 1x 10^{-4} g/m^3 do not need to be reported; list values to two significant digits max.
2. Tmin not provided, Tmax 330 °F

Assumptions

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5.4.8.3 Thermal Catalytic Oxidizer (HOP-SCO-00001, HOP-SCO-00004)

Routine Operations

The gas from the catalyst skid electric heater flows to the thermal catalytic oxidizer (TCO). The TCO oxidizes organics to carbon dioxide and water and possibly acid gases (depending on the presence of halogenated organics in the gas). The TCO operates at about the same temperature as the NO_x SCR. The TCO is placed in front of the NO_x SCR to take advantage of the decomposition reaction heat generation to maintain the NO_x SCR operating temperature, although little heat is generated. This arrangement also prevents the formation of NO_x in the TCO from the oxidation of ammonia used in the NO_x SCR. The TCO catalyst is likely to be a platinum-based material deposited on a substructure that is held in frames and is inserted and removed through access doors. This facilitates easy changeout.

This equipment is operated at low relative humidity.